Module Code	PSU11011
Module Name	Statistics and Methodology (SaM1)
ECTS credit weighting	10 ECTS
Semester taught	Semester 2
Module Coordinator/s	Clare Kelly, Emma Wrightman
Module Learning Outcomes with embedded Graduate Attributes	**At the end of the module, students will be able to:** 1. Explain and demonstrate how Null Hypothesis Significance Testing is used in psychological research. 2. Explain the importance of data visualisation as a first step in any analysis. 3. Explain and apply basic bivariate parametric and non-parametric statistical tests: correlation, t-tests and their non-parametric equivalents, and Chi-square, using Python programming. 4. Differentiate between and classify research designs and select the appropriate statistical test to apply, given the research design and the data type. 5. Explain the importance of computing effect sizes and confidence intervals and be able to apply the procedures to produce these for each statistical test covered. 6. Apply APA conventions for reporting results of statistical tests, including effect sizes and confidence intervals. 7. Evaluate and critique research to distinguish good, reproducible research practices from Questionable Research Practices (QRPs). 8. Plan and execute a research study – from formulation of research question and hypotheses, to data collection, management, and statistical analysis, to report write-up.
Module Content	Building on the foundational training in research methods and statistics provided in PSU11010 RSaM1, SaM1 progresses to the theory and practice of inferential statistics. In addition to equipping students with the fundamentals of bivariate statistics, including correlation, t-tests, and analyses of frequency data, this module will provide students with further training in how to think as a psychological scientist – including study design for reproducible research and concepts such as statistical power. As for RSaM1, the research and statistical skills students acquire in this module are broad and transferable critical skills that are important not for their careers as psychology students, but also for navigating the world beyond the university.

Teaching and Learning Methods[1]

Students will encounter the following teaching and learning methods in this module

- *Problem-based learning.* During seminars and labs, and in assignments, students engage with real-world open-ended research questions; they work collaboratively or individually to find potential solutions by applying their learning.
- *Practice-based learning*. There is an emphasis on "learning by doing" - designing research, collecting data, and working with those data, to foster a better understanding of the material and to make connections between *theory* and *practice* through direct hands-on experience.
- *Team-based learning*. Students engage in team-based learning during seminars and labs.
- *Lab-based learning*. Students learn how to collect, manage, and analyse data using computers and the Python programming language.
- *Reflective and integrative learning.* Students are supported to reflect on their learning, to integrate knowledge acquired in different modules, and to apply that knowledge to solve real-world problems.

Assessment Details[2]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**

It is recommended that module co-ordinators consider assessment types used across the year to ensure varied assessment methods.

Assessment Component	Assessment Description	LO Addressed	% of total
Report 1	Students conduct a psychological experiment in a seminar session, and will apply their learning on statistical analyses to analyse the data and write up a psychology report.	1-8	25%
Report 2	Students conduct a psychological experiment in a seminar session, and will apply their learning on statistical analyses to analyse the data and write up a psychology report.	1-8	25%

[1] Trinity-INC provides tips and resources on how to make your curriculum more inclusive.
[2] https://www.tcd.ie/academicpractice/resources/assessment/

Python Homeworks	Assignments designed to provide students with the opportunity and incentive to practice working with the python procedures covered in the weekly labs.	3,6	10%
Exam	In-person exam, open-book exam (2 hours) covering theory and python material from the term.	1-8	40%

Academic Integrity

Academic honesty is a fundamental principle of academia – it means that the work you submit, regardless of its form, is **original work completed by you, and that you are the sole author**. Students, like all academics, are expected to build on the work of others – but this means that you must fully and explicitly acknowledge or declare the contributions of others or specific tools (e.g., AI tools) to your work. Failure to correctly do so is academic misconduct, and is considered a very serious offence. Most commonly, this takes the form of plagiarism, which means using someone else's words or ideas and passing them off as your own (i.e., failing to acknowledge that they are not yours). Plagiarism is academic fraud. Copying all or part of an assignment straight from a paper, book, the internet, fellow student, or generative AI tool, without acknowledgement, is a considered plagiarism, and will be treated as such under the College policies for academic misconduct.

There is an extensive guide on plagiarism and how to avoid it, available here: https://libguides.tcd.ie/academic-integrity/. All students are required to complete the Ready Steady Write tutorial and to sign a declaration confirming that they have done so and that they understand what plagiarism is, which must be submitted with any assignment. A special cover page is provided on Blackboard for this purpose.

Generative AI. No **generative AI** is used to create any of the content for this module, or to assess or comment on anything students submit as part of your participation in the module. This is because generative AI tools are environmentally destructive, unethical, and unreliable, but most important, they undermine the thinking skills that make us both human and intelligent.

When it comes to doing research and writing text (e.g., for the assignments), the guidance is clear - students must have **full ownership of, and accountability for, every word of the work you submit, and they must appropriately acknowledge all sources used in the preparation of the work.** The School of Psychology has a detailed Policy on Generative AI tools, such as ChatGPT, Gemini, Claude, etc., which all students should read carefully. **Any undisclosed and/or inappropriate use of generative AI tools may**

violate the principles of academic integrity, and may therefore be subject to procedures related to academic misconduct.

In this module, we use Google Colab for python coding. Google Colab offers access to AI tools that will generate and suggest code to achieve a specified goal and troubleshoot errors. These tools may enable students to feel like you can "code like a pro," but if we do not understand the basics of python, then we will never actually learn to code. We will also be unable to understand the code that Gemini and other AI tools provide you, so we won't be able to know if the code is doing what we expect or not. Unfortunately, generative AI coding tools are not 100% reliable, and we risk being very seriously misled if we rely on them rather than acquiring the fundamentals of python coding ourseles. Importantly, **students are not permitted to use generative AI tools in the end-of-semester exam**, which will include questions that assess understanding of python code, as well as the ability to use it.

The School of Psychology requires a declaration of **ALL and ANY** generative AI use to be completed and submitted with all work (exams, assignments). This declaration is made in addition to the standard declaration of academic integrity as part of the assignment cover page. Any assignment submitted without the declaration will not be marked. Such assignments will be returned to the student and must be resubmitted with the cover page, potentially resulting in a delayed mark.

Contact Hours and Indicative Student Workload[3]

Contact hours: 1 hour lecture, 2 hour seminar, 2 hour lab, per week (55 hours in total)
Independent Study (preparation for course and review of materials): 70 hours
Independent Study (preparation for assessment, incl. completion of assessment): 125 hours

Inclusive Curriculum

	PLEASE TICK
1. Have you reviewed the teaching / assessment methods and materials for possible barriers to learning, e.g. students with English as a second language, disabilities, significant external responsibilities, students with IT issues / requiring specific accessibility software etc.?	☒
2. Have you adapted your resources and teaching materials taking into account Trinity's Accessible Information Guidelines (https://www.tcd.ie/disability/teaching-info/TIC/materials.php)?	☒

[3] https://www.tcd.ie/academicpractice/resources/assessment_workload/

	3. Does the content of your module address diversity? For example, including a diverse demographic profile of authors, diversity of ideas and perspectives, or representation (e.g. pictures of conditions on different skin tones), or by acknowledgement of the homogenous context of the discipline/topic?	☒
	4. Highlight at least two ways which your course/module incorporates principles of inclusivity and accessibility into the curriculum design **Engagement:** Expectations (guidelines, examples) are clearly stated, along with strategies for approaching the exam. Team/group work is integral. Detailed, actionable feedback on assessments is provided. **Representation:** Blackboard is organised according to accessibility principles, and diverse materials are prioritised (e.g., e-textbooks, online resources); recordings are provided (lectures, assignment guidelines); discussion boards are emphasised for peer-to-peer and instructor support. **Action and expression:** Learning approaches facilitate dialogue and peer interaction	

Indicative Reading List (approx. 4-5 titles)	Statistical Thinking for the 21st Century - Russell Poldrack: https://statsthinking21.github.io/statsthinking21-core-site/ Answering questions with data - Matthew J. C. Crump: https://crumplab.com/statistics/ How to design and report experiments - Andy Field and Graham Hole: Four copies in Berkeley library LEN 150.72 P27;1 and one online copy on library computers. **Chapters will be shared through Blackboard.**
Module Pre-requisite	PSU11010 Research Skills and Methodology
Module Co-requisite	None
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No